9 VAC 25-400-10. Dulles area waste treatment and water quality management policy.

A. Purpose. To recommend to the board for adoption a policy for interim and longterm solutions to problems associated with providing sewage-treatment capacity in the Dulles-area watershed. The Dulles-area watershed encompasses that portion of Fairfax County north of the Arlington/Fairfax County line to the Dulles Airport; the southern part of Loudoun County; the Towns of Leesburg, Herndon, Vienna; and the Dulles Airport. The Dulles-area watershed, which excludes the area drained by the Pimmit Run Interceptor, is shown on Figure 1.

B. Background.

1. The Dulles-area watershed drains into the Potomac River above and below the existing and proposed water-supply intakes for the Washington Suburban Sanitary Commission, the District of Columbia and the newly proposed Fairfax County Water Authority intake. Figure 1 indicates the locations of the existing and proposed water intakes in the Dulles-area watershed. For added protection against the possibility of drinking-water-source contamination, the Dulles-area watershed policy requires that all AWT effluents discharge into receiving streams a minimum of ~~15~~ **10** river miles upstream from any water-supply intake. Figure 1 locates the reference point ~~15~~ **10** river miles upstream of the existing and proposed water intakes along the Potomac River for Broad Run.

2. Public Law 86-515, Federal Statute authorized the District of Columbia to plan, design, construct, operate, and maintain the Potomac Interceptor to extend from Dulles International Airport to the District of Columbia System. The statute provided for the interceptor to be of sufficient capacity to serve the expected community growth and development in the adjacent areas of the States of Virginia and Maryland. To implement the use of the Potomac interceptor by the Northern Virginia jurisdictions, contracts between the participating jurisdictions and agencies and the District of Columbia were executed. The Dulles-area

watershed is currently served by the Potomac interceptor system which delivers sewage to the Blue Plains Sewage Treatment Plant in the District of Columbia. While the Virginia jurisdictions have not used all of their allotted capacity in the Potomac interceptor, they have already used their allotted portions of the Blue Plains treatment capacity. These allocations were originally agreed upon in the October 1970 Memorandum of Understanding as modified by the October 1971 Blue Plains Interim Program Agreement and subsequently enforced by the Consent Decree of June 1974.

There are also two small, marginal performance sewage treatment plants located in the Dulles-area watershed: one at Herndon (.3 MGD) and one at Leesburg (1.3 MGD). Since flows are approaching the capacities of these facilities (Herndon's average flows over the past year have been 0.29 MGD; Leesburg's average flows over the past year have been 0.759 MGD; in both cases, BOD_5 certificate limits have been exceeded), other means must be provided to serve the additional needs projected for the Watershed.

C. Discussion. The Northern Virginia Planning District Commission (NVPDC) made a study of the sewage treatment needs of the Dulles-area watershed (Study Area I). The study assumed that the District of Columbia would provide treatment capacity to the Dulles-area watershed in accordance with the agreements mentioned above. According to NVPDC's study, although the required transport system capacity would be available in the Potomac interceptor, the required treatment capacity would not be available within the Blue Plains Plant itself. Rather, this treatment capacity would be provided by the construction in Maryland, (by Maryland agencies), of sewage treatment facilities which, through connections and redistribution of allocations among new and existing treatment facilities, would make the agreed upon capacities available to Northern Virginia. The history of prior attempts at regionalization indicates that this is not a sound basis for planning to meet the needs of the Dulles-area watershed.

Further, the NVPDC study, by approving the retention and expansion of existing treatment facilities in the watershed, does not adequately consider the existing and planned water-supply intakes on the Potomac river. As pointed out by the Department of Health, distance provides time for die-off of pathogenic microorganisms that may survive the treatment process and will provide more natural purification before the effluent reaches the water intakes on the Potomac river. Utilizing the concept of a single regional plant site in the vicinity of Dulles

airport for the long-term treatment of sewage in the watershed, maximizes the distance criterion since this allows the use of a Broad Run discharge point for treated sewage which is over 15 miles above the nearest proposed and existing water intakes.

Because of the two reasons explained above, the State Water Control Board undertook a study which recognized the realities which prevail in the metropolitan Washington region, which would protect water-supply intakes, and which would meet the requirements for grant assistance prescribed by P.L. 92-500. As a result of this State Water Control Board study, a State Water Quality Control Plan, including a wastewater-treatment plan for the Dulles-area watershed, was prepared by the State Water Control Board and brought to public hearing on June 26, 1974, and adopted on August 26, 1974, by the State Water Control Board. For the purpose of providing criteria and standards for the implementation of the adopted plan, a comprehensive policy for the Dulles-area watershed has been developed. This is contained in Attachments A and B.

D. Staff recommendations.

1. Policy for the Dulles-area watershed. The staff recommends that the board adopt the following policies to apply to waste treatment and water-quality management in the Dulles-area watershed, in accordance with the authority vested in the board in Section 62.1-44.15 (13) of the State Water Control Law:

a. Long Range Policy for the Dulles-area watershed - see Attachment A.

b. Interim Plan for the Dulles-area watershed - see Attachment B.

E. The regional plant's discharge shall be into Broad Run and in no case shall the plant's discharge be located less than 10 stream miles above an existing or presently proposed domestic water supply intake.

POTOMAC EMBAYMENT STANDARDS

The standards of quality for sewage treatment plant effluents, based on a one-month average are:

			NOTES
1.	Biochemical oxygen demand	Not greater than 3 ppm	A, B

2.	Unoxidized nitrogen	Not greater than 1.0 ppm during the periods April 1 through October 31	B, C
3.	Total phosphorus	Not greater than 0.2 ppm	D
4.	Total nitrogen (when technology is available)	Not greater than 1 ppm	E

BACKGROUND NOTES

A. This BOD_5 standard is a factor of three less stringent than that being presently produced at the Lake Tahoe plant which is approximately 1 ppm of BOD_5.

B. A BOD_5 of 3 ppm and 1 ppm of unoxidized nitrogen will result in a UOD of approximately 10 ppm.

C. To achieve this level of unoxidized nitrogen, nitrification can be accomplished by limiting the BOD load on aeration units to 25 pounds per 1000 cubic feet or less and designing the aeration units to maximize the "plug-flow" principle.

D. This phosphorus standard is a factor of two less stringent than that being presently produced at the Lake Tahoe plant which is .1 or less ppm of P.

E. For the time being, the requirement for total nitrogen removal is waived. However, all plants will have to have facilities to meet this standard as soon as practical after a technically feasible process with year-round reliability is developed and available.

ATTACHMENT A

LONG-RANGE POLICY FOR WASTE TREATMENT AND WATER-QUALITY MANAGEMENT IN THE DULLES-AREA WATERSHED

Long-Range Policy.

I. General Location and Capacity of the Regional-Treatment Plant: The regional-treatment plant for the Dulles-area watershed shall be located in the general vicinity of the Dulles Airport, in the Broad Run Watershed. Broad Run is the area's most suitable receiving water, because of

all the streams in the Dulles-area watershed that are not also water suppliers, it has the highest seven day, 10-year low flow. Broad Run's hydrologic capacity qualifies it to be at least adequate for the planned discharge of 15 MGD. Furthermore, a discharge in the upper reaches of Broad Run allows for the maximum distance from existing and proposed waterworks intakes and, therefore, provides the maximum die-off time of pathogenic microorganisms. The Northern Virginia Metropolitan Regional Plan characterizes the Broad Run as the stream having the highest water quality in the Dulles-Area Watershed and, therefore, the level of treatment of sewage discharged into Broad Run is of prime importance in order not to degrade the existing high water quality.

A. If FAA concurrence can be obtained, the regional plant can be located on Dulles-Airport property in order to minimize cost, utilize the existing airport buffer zone as the buffer zone required around a sewage-treatment plant, and utilize for another public service function an area already environmentally degraded by noise.

B. The plant shall have an initial capacity as called for in the Northern Virginia Metropolitan Regional Plan between 7.5 and 15 MGD.

C. Capacity beyond that covered in I.B. above can be obtained by the jurisdictions either by making legally binding arrangements for capacity in plants in Maryland (if such capacity is available) or by expanding the Dulles-area regional plant. The determination of the expanded capacity needed for the Dulles-area watershed shall be the responsibility of the local jurisdictions.

D. The allocation of capacity in the regional plant in the Dulles area shall be carried out by the participating jurisdictions, according to allocation criteria established at the time of the establishment of an institutional arrangement which will carry out this long range policy.

E. The regional plant's discharge shall be into Broad Run and ~~preferably located about 20 stream miles above existing and proposed domestic water supply intakes on the Potomac River. I~~ **i**n no case shall the plant's discharge be located less than ~~15~~ **10** stream miles above an existing or presently proposed **domestic** water-supply intake.

II. Design Requirements for the High Performance Regional Plant: The design of the high performance sewage treatment plant in the Dulles-area watershed shall meet all the requirements

specified herein (see Table I) as well as those specified in the very minimal sewage industry standards (e.g., the Ten State Standards), the EPA Design, Operation and Maintenance Guidelines of September 1970, the EPA Bulletin No. EPA-430-99-74-001, Class I Plant, and other standards adopted by the Department of Health and the State Water Control Board.

A. General requirements:

1. The initial back-up capacity within the plant shall be 100% for the initial plant size of 7.5 MGD. If, after the initial two years of continuous satisfactory operation, the plant's reliability has been satisfactorily demonstrated, additional treatment trains can be added up to a ratio of four treatment units to one stand-by train. As a substitute for on-site back-up capability in the initial plant, the force-main system, and in associated pumping stations for the regional plant, it will be permissible to meet the 100% back-up requirement through use of the Dulles Interceptor sewer and the Blue Plains Treatment Plant, thus providing positive and reliable protection for the water supply at minimum cost, provided that appropriate terms and conditions can be negotiated with the D.C. Environmental Services Department and provided that these terms and conditions are consistent with all applicable water quality and treatment standards and federal and state discharge permits.

2. The design shall be such that expansions and maintenance of any unit can be accomplished without bypassing wastes to the receiving waters and without degrading treatment.

3. The mechanical and fluid system design shall be such that a single failure of a component or unit shall not interrupt plant operations which are required to meet the final effluent requirements of Table I.

4. There shall be one independent source of outside power and one "on-site" power supply. (Note: If a site on Dulles-Airport property is used and the Airport has an on-site emergency power supply, and if the FAA concurs, a common on-site emergency power system could be used and would be acceptable to comply within the requirements of the policy.) Both the "off-site" and "on-site" electrical distributions shall be such that the failure of any one given component (mechanical or electrical) in the distribution system shall not cause an interruption of electrical service to parts of the plant which are essential to meet the effluent requirements of Table I.

B. Changes in plant-design requirements. Changes to the plant-design requirements described or referenced herein shall only be acceptable if the change does both of the following:

1. Improves or equals the plant performance and final effluent quality.

2. Improves and equals plant reliability and maintainability.

Changes to the plant design solely to reduce cost and which jeopardizes plant performance and reliability will not be approved.

Before such changes are incorporated in the plant, specific written approval shall be obtained from the State Department of Health and the State Water Control Board.

III. Plant performance requirements. The plant performance requirements for the regional plant discharging to the Dulles-area watershed are given on Table I.

IV. Administrative and technical requirements for the control of the sewer system in Dulles-area watershed.

A. The owner to whom the certificate is issued for operation of a regional plant shall meet the general and administrative requirements covered below. These requirements shall also be contractually imposed by the owner on any parties or jurisdictions, or both, with which the owner may contract for waste water processing.

B. The high performance regional treatment plant shall be manned by an adequate number of trained and qualified operating, maintenance and laboratory personnel and manned continuously 24 hours a day, seven days a week, throughout the year.

C. The "owner" shall include, as part of his preliminary and final plans and specifications which are submitted to the State Department of Health and the State Water Control Board for approval, a detailed statement indicating how each of the technical and administrative requirements in this policy have been met. Any proposed deviation from any of these requirements shall be clearly identified and technically justified, and shall require formal State Department of Health and State Water Control Board approval. These submittals shall also include:

1. Simplified fluid-system diagrams which clearly identify the following:

a. The average and peak capacity of each unit.

b. The number of units of each type needed to handle the normal average flow and the peak flow.

c. The number of spare units and their capacity for both average and peak flow cases shall also be identified.

In addition, a brief narrative summary description shall be submitted to identify what has been done to ensure that each unit and major subsystem can be maintained and expanded without release of effluent that does not meet the minimum standards.

2. A simple one-line power distribution-system diagram showing how outside power is brought into the plant and how power is distributed within the plant proper shall be submitted.

This diagram shall also show as a minimum:

a. Ratings and characteristics of electrical components such as transformers, circuit breakers, motor controllers, etc., making up the system.

b. Protective devices such as thermal overloads, under-frequency relays, or under-voltage relays.

c. Voltages supplied by all buses.

d. Normal circuit breaker and switch conditions (Notes shall also be provided as required to cover abnormal, casualty and emergency operating modes.)

e. How electrical loads are combined into switch gear and load center (the use of cubicle outlines in phantom or dotted line is suggested).

D. The final submittal of plans and specifications for the plant to the State Department of Health and the State Water Control Board shall include a systematic failure mode and effects analysis on the mechanical and electrical portions of the plant so as to demonstrate that a single failure of a mechanical or electrical component will not interrupt the plant operations which are necessary to meet the effluent requirements of Table I of this Attachment.

E. Pumping stations on all collection systems which are located in the Dulles-area watershed and draining into the regional plant shall (i) have stand-by pumping units, (ii) have "on-site" back-up power supply, (iii) have "off-site" power supply, (iv) be signed so that no single failure of a mechanical or electrical component could degrade pumping capability, (v) have pumps and valves arranged so that these units can be removed and replaced without the by-passing of sewage, (vi) have flow-measuring devices with provisions for automatic recording of

flow, and (vii) have retention basis of a minimum one day capacity. If these pumping stations are remote and unmanned, an alarm system shall be provided at manned stations to indicate that problems are developing and to direct maintenance assistance to the affected pumping station. The owner of each pumping station shall be required to obtain approval from the State Department of Health and the State Water Control Board.

F. The major junctions in all collection systems draining into the regional plant (e.g., at least at the 1 to 2 MGD collection points) shall have continuous recording flow-measuring devices to help in the early identification of problem portions of a collection system in the event of unexplainable high flows (e.g., excessive infiltration). Also, such flow measuring devices and isolation valves shall be provided between jurisdictions as well as between any others who contract for services of the regional plant. The flow-measuring devices and isolation valves between jurisdictions shall be under the control and responsibility of the owner to whom a plant certificate is issued.

G. A positive siltation control program must be implemented to control siltation from both public and private projects involving land-disturbing activities within the Dulles-area watershed. Such a program shall include the establishment of positive physical steps for the control, monitoring, and correction of siltation problems. Specifically, such a program shall require the use of siltation basins which have a specified silt level that is not to be exceed without requiring the basin to be cleaned out and other corrective measures taken to correct the causes of the excessive siltation.

H. Each political jurisdiction within the Dulles-area watershed shall control industrial-waste discharges to sewage-treatment plants. These control measures shall also meet with the approval of the owner before the owner contracts to supply treatment services. Specifically, any chemicals which cause deleterious effects on waste-treatment processes are to be prohibited. Further, each industry shall be required to provide as a minimum, a sampling station where all of the waste from their individual plants can be sampled and the flow measured and recorded at a point just before it enters into the treatment plant's sewage collection system.

I. An owner's interceptor and collection system in the Dulles-area watershed shall be designed, installed, inspected and tested by the respective owner to limit infiltration to 100

gal/inch/dia/mile-day as a minimum. The test results shall be certified and submitted to the State Water Control Board.

J. As-built drawings and manuals shall be available at any time for State Water Control Board and State Department of Health inspection and review. These documents shall include as a minimum:

1. As-built electrical and fluid-system diagrams.
2. Detailed as-built and installed drawings.
3. Normal operating and casualty-procedures manual.

The documents shall be updated at least once a year to reflect all changes and modifications to the plant.

K. The design engineer shall have the responsibility of meeting the proposed effluent quality as shown in Table I. To demonstrate that the plant as designed by the engineer can meet the effluent standards, the plant is to be operated under adequate supervision for a minimum of one year of continuous operation after the "debugging" period.

L. Waste currently being processed in the existing small plant's (Herndon and Leesburg) shall have the first priority on treatment capacity and such capacity shall be specifically reserved for them in the new high performance regional plant. New developments are to have second priority.

TABLE I

MAXIMUM EFFLUENT QUALITY REQUIREMENTS FOR THE REGIONAL PLANT

IN THE

DULLES AREA REGIONAL PLANT

	BOD mg/l	COD mg/l	Suspended Solids mg/l	Nitrogen mg/l	Phosphorus mg/l	MBAS mg/l	Turbidity Ja Units	Coliform Per 100 ML Sample	Virus
Effluent Requirements	**1.0**	**10.0**	**0****	**1**	**0.1**	**0.1**	**0.4**	**less than 2**	**0****
Percent Removal These are <u>for information only:</u> Requirements	**~99.5%**	**~98.0%**	**100%**	**97%**	**~99.5%**	**~99%**	**~100%**	**~100%**	**100%**

***As measured on a weekly average. Since these are minimum requirements, the normal average would be expected to be substantially better.**

****Unmeasurable.**

ATTACHMENT B

INTERIM PLAN FOR THE DULLES-AREA WATERSHED

This attachment sets forth the requirements for interim treatment in the Dulles-area watershed once a firm commitment has been obtained from the jurisdictions concerning a long-range solution as outlined in Attachment A. Only two sewage-treatment facilities, performing on an interim basis until the long-range solution outlined in Attachment A is implemented, shall exist in the Dulles-area watershed. These are:

1. One interim facility which is located in the Broad-Run watershed and in the immediate vicinity of the Dulles Airport. This interim facility may be in the 2 to 4 MGD range provided that it:

a. Meets the Virginia Potomac Embayment Standards plus filtration of the effluent, thereby assuring the highest practicable interim water-quality effluent requirements and a high degree of disinfection, and

b. The plant be manned 24 hours a day, seven days a week, and be provided with the necessary sampling and laboratory equipment and qualified people needed to operate the plant and monitor the effluent quality.

2. A second interim facility located at the existing Leesburg Plant: The second interim facility can be provided by undertaking an interim expansion of the existing Leesburg plant once the existing plant has demonstrated that it can meet its present design requirements. Presently, and for many months, this plant has not performed satisfactorily. Once the effluent quality standards have been met, the State Water Control Board will allow a modest expansion of this facility provided that Leesburg has an active program to eliminate infiltration into the existing collection and interceptor system that serves the plant; that the interim facilities meet the same requirements as outlined above for the interim plant in the Dulles area.

The proposed interim expansion as described above in paragraphs 1 and 2 shall be reviewed with the responsible institution established to implement the long-range regional plant discussed in Attachment A. Such a review is to ensure that to the maximum extent reasonably possible, the interim facilities can be readily incorporated into the regional system. The

concurrence of the responsible institution shall be submitted to the State Water Control Board along with any submittals or proposals for interim plants as discussed in paragraphs 1 and 2 above.

The plans and specifications for expansion of collection and interceptor systems shall be reviewed by the responsible institution implementing the long-range plans and the concurrence of the responsible institution shall be obtained before the plans and specifications are submitted to the State Water Control Board and the State Department of Health for approval. Any proposed expansion of the associated collection and interceptor system shall meet the technical and administrative requirements of Attachment A, Section IV. Further, the jurisdictions proposing such expansion shall submit a letter to the State Water Control Board stating that their facilities will meet the requirements of Section IV.

It is understood that any approval of interim facilities discussed in paragraphs 1 and 2 above is predicated upon the requirement that these will be abandoned and/or incorporated into the long-range system once the long-range system has been made operation[al].

1 Study Area I, Wastewater Treatment Study, Phase I, November, 1973. Prepared for NVPDC by CH2M Hill.

2 Study Area I, Wastewater Treatment Study, Phase II, April, 1974. Prepared for NVPDC by CH2M Hill.

3 Chapter 100, Study Area I, Water Quality Management Plan for Northern Virginia, April, 1974. NVPDC

4 A Report of Progress and Conclusions, January, 1973. Washington Area Interstate Water Resources Program.

5 State Department of Health Letter, dated 3 June 1974, subject: Single 15 MGD Wastewater Treatment System in Study Area No. I - Northern Virginia Planning District Commission. (Document Attached.)

6 State Department of Health Letter, dated 27 June 1974, subject: Study Area No. I - Sewerage. (Document Attached.)

7 Region III, EPA, letter, dated July 11, 1974, concerning EPA's policy on interim facilities in the Washington area. (Document Attached.)

8 Evaluation of the Feasibility of a Single Regional Wastewater Treatment System in Study Area I, May, 1974. Prepared for the SWCB by Culp, Wesner, Culp and Patton, Harris, Rust & Guy.

9 Memorandum of Understanding on Washington Metropolitan Regional Water Pollution Control Plan, October 10, 1970.

10 Blue Plains Interim Treatment Program Agreement, October 18, 1971.

11 Consent Decree incorporating Blue Plains Sewage Treatment Plant Agreement, June 13, 1974.

* Supra.

Statutory Authority

§62.1-44.15(3) of the Code of Virginia.

Historical Notes

Derived from VR680-11-04; eff. October 26, 1988.